FCC §15.247(a) (1) (iii) - TIME OF OCCUPANCY (DWELL TIME)

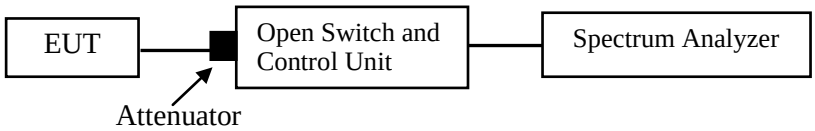
Applicable Standard

Frequency hopping systems in the 2400-2483.5 MHz shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Test Procedure

According to ANSI C63.10-2013, section 7.8.4

1. The EUT was worked in channel hopping.
2. Set the RBW to: 1MHz.
3. Set the VBW ≥ 3×RBW.
4. Set the span to 0Hz.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Recorded the time of single pulses



Test Data

Environmental Conditions

Temperature:	25℃
Relative Humidity:	43%
ATM Pressure:	101.0kPa

The testing was performed by Matt Liang on 2023-06-06.

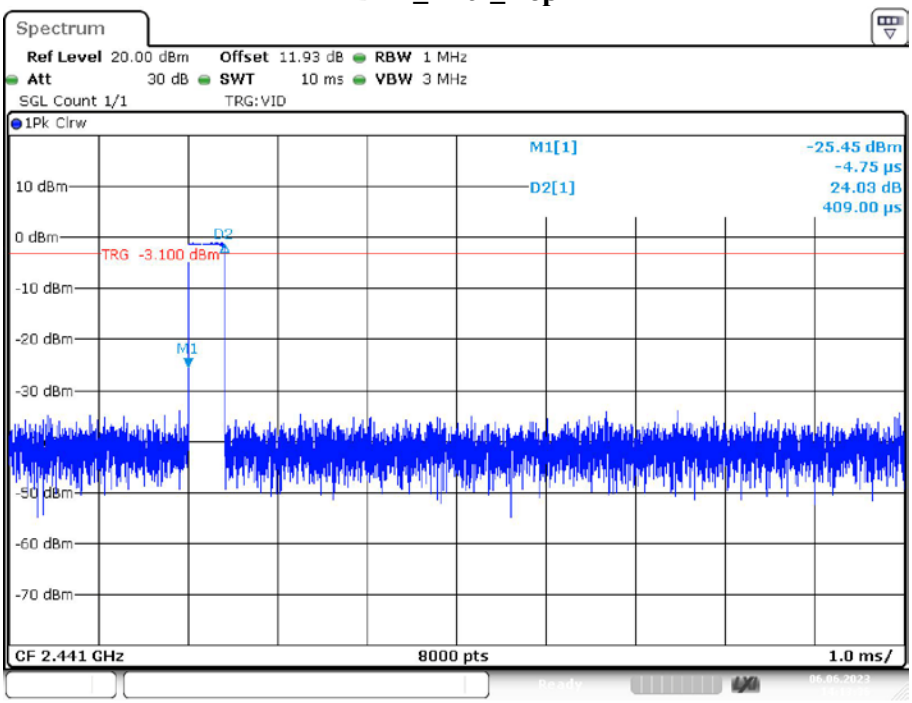
EUT operation mode: Transmitting

Test Result: Compliant. Please refer to the below table and plots:

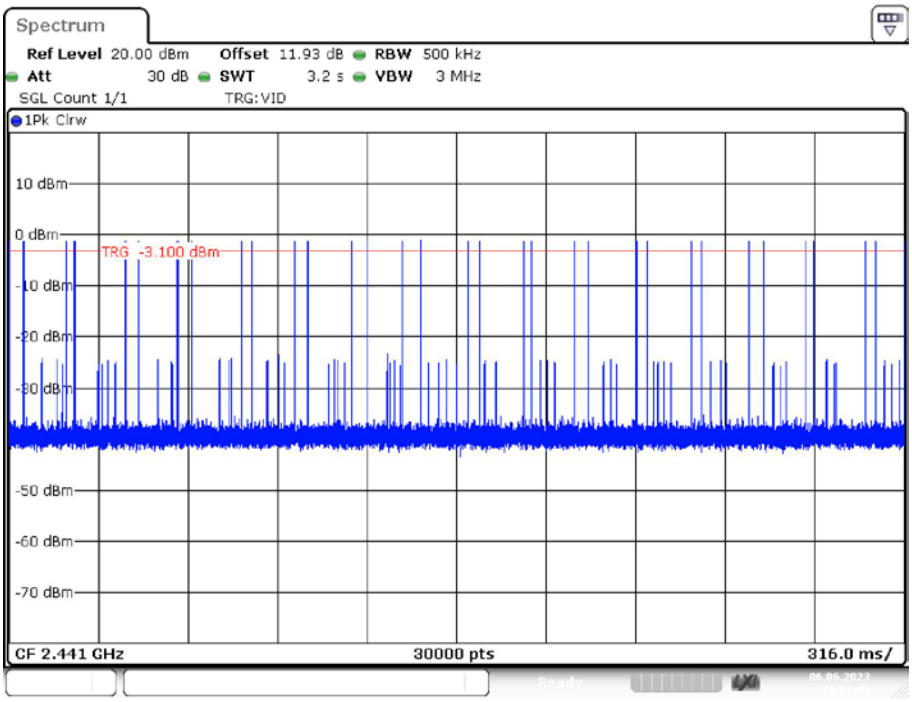
Test Mode	Antenna	Channel	Burst Width [ms]	Total Hops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.409	320	0.131	≤0.4	PASS
DH3	Ant1	Hop	1.656	180	0.298	≤0.4	PASS
DH5	Ant1	Hop	2.897	110	0.319	≤0.4	PASS
2DH1	Ant1	Hop	0.418	320	0.134	≤0.4	PASS
2DH3	Ant1	Hop	1.661	150	0.249	≤0.4	PASS
2DH5	Ant1	Hop	2.903	100	0.29	≤0.4	PASS
3DH1	Ant1	Hop	0.419	330	0.138	≤0.4	PASS
3DH3	Ant1	Hop	1.663	140	0.233	≤0.4	PASS
3DH5	Ant1	Hop	2.905	110	0.32	≤0.4	PASS

Note 1: A period time=0.4*79=31.6(s), Result=Burst Width*Total Hops
Note 2: Total Hops =Hopping Number in 3.16s*10
Note 3: Hoping Number in 3.16s=Total of highest signals in 3.16s (Second high signals were other channel)

DH1_Ant1_Hop



Date: 6.JUN.2023 14:13:36



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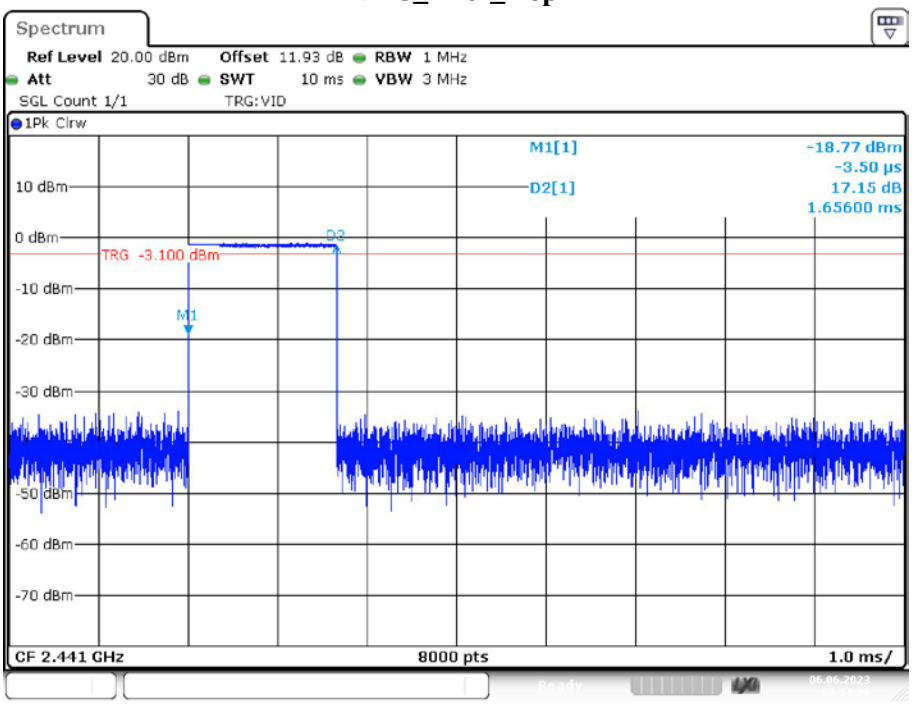
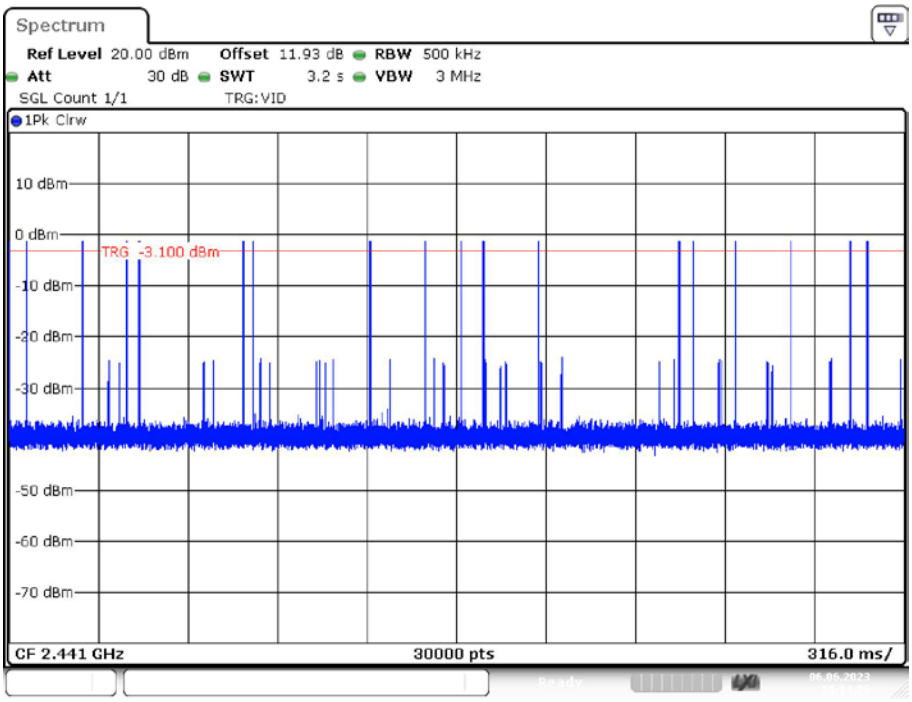
DH3_Ant1_Hop



Date: 6.JUN.2023 14:14:21



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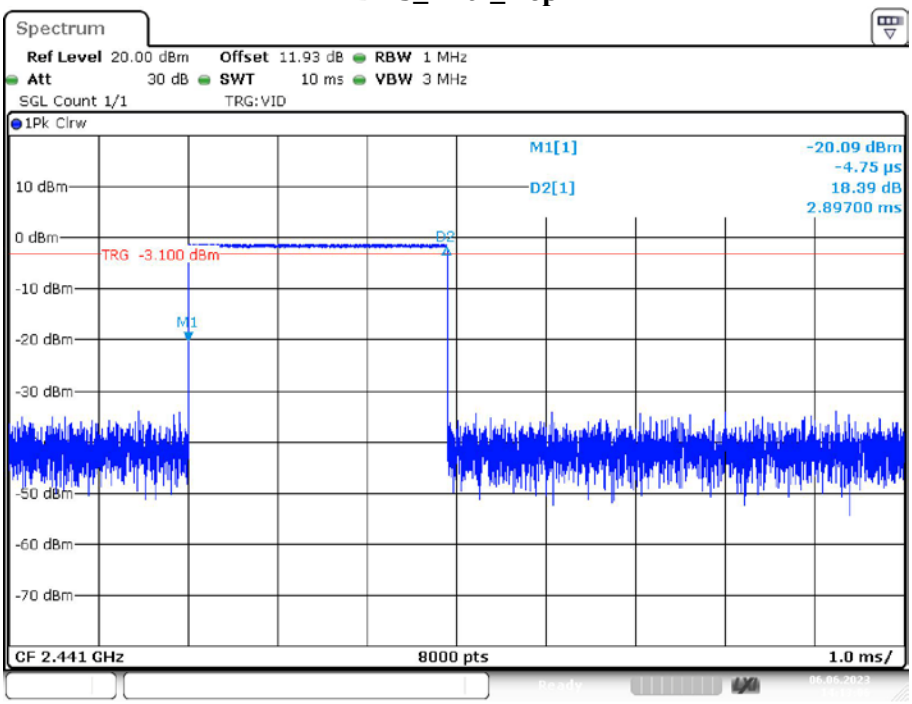
DH5_Ant1_Hop



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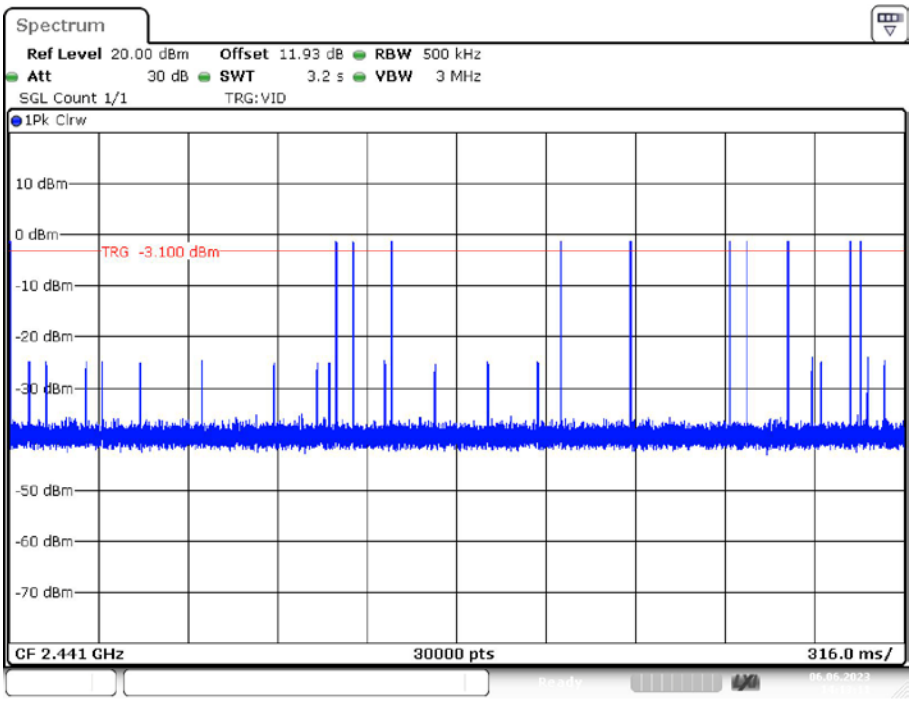

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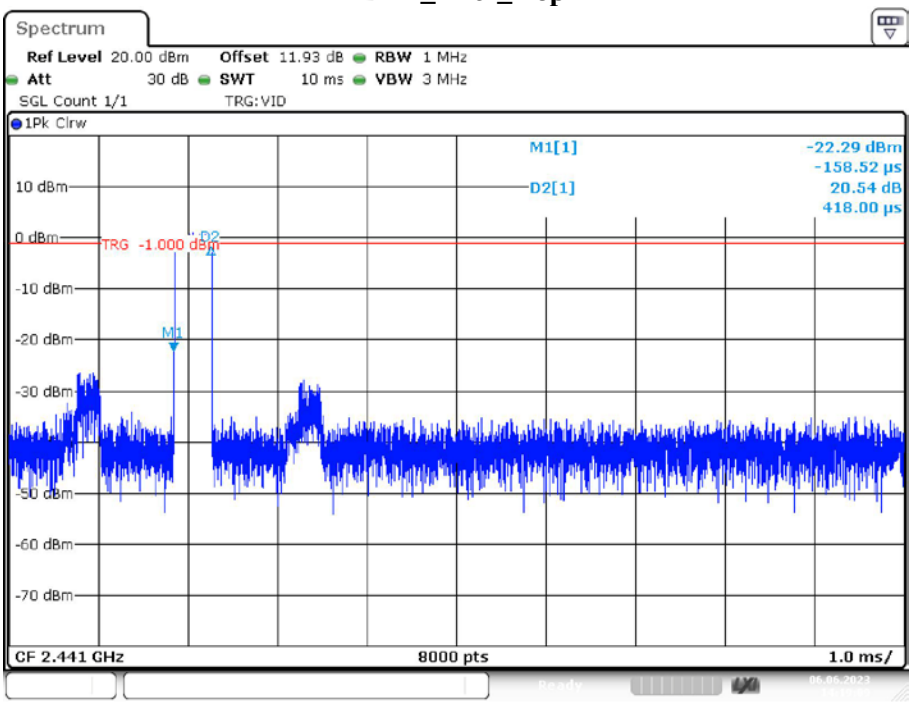
2DH1_Ant1_Hop



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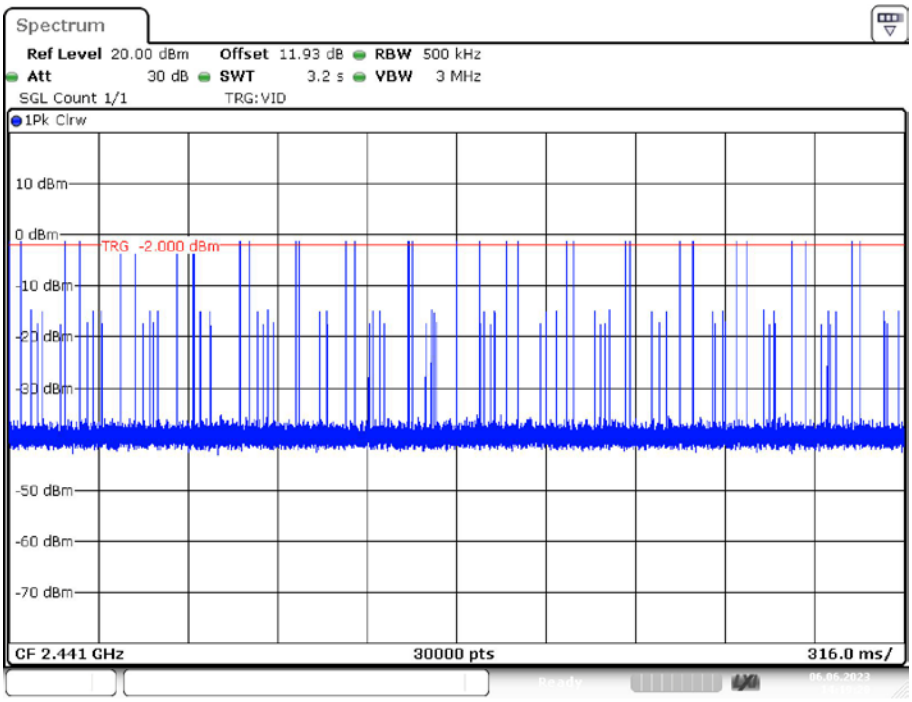

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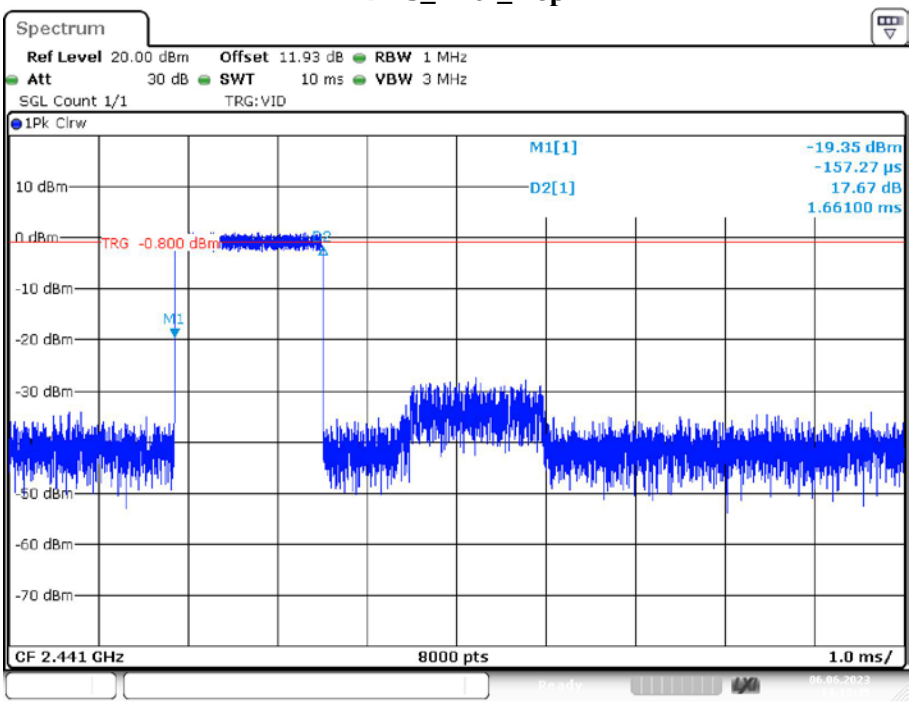
2DH3_Ant1_Hop



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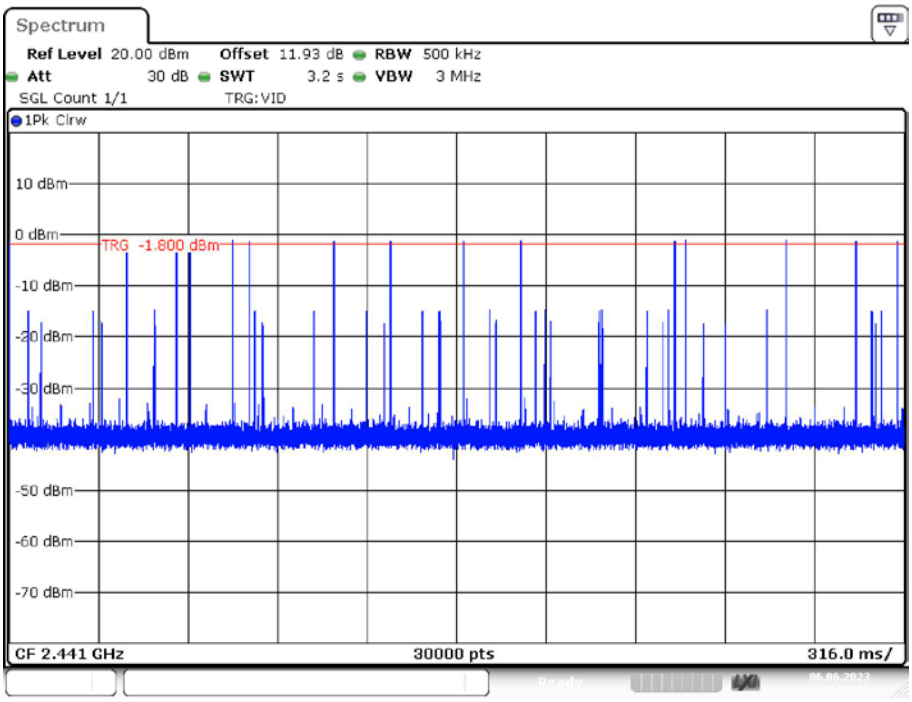

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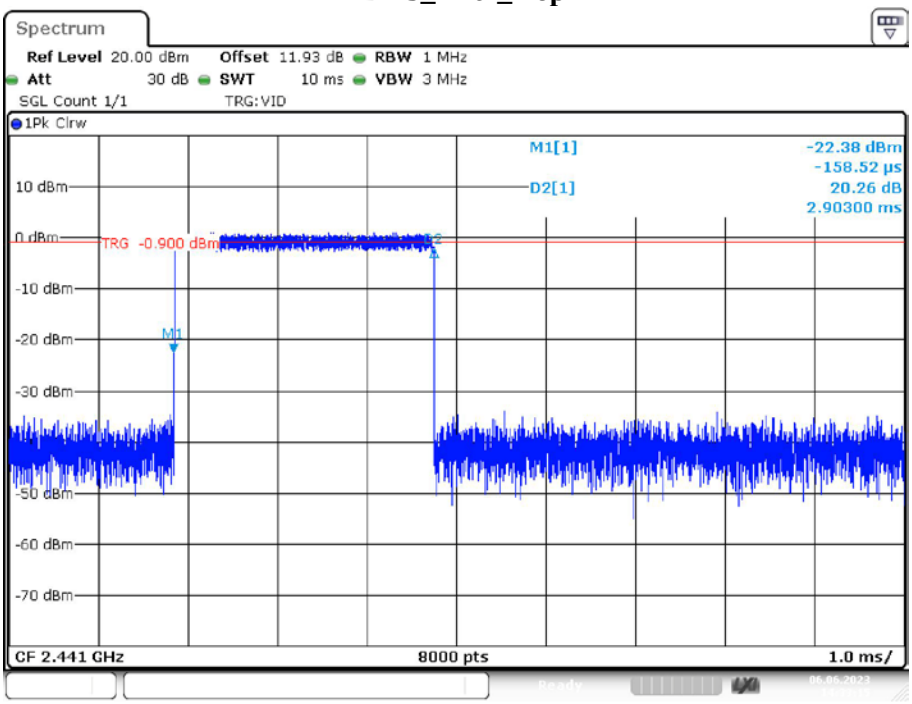
2DH5_Ant1_Hop



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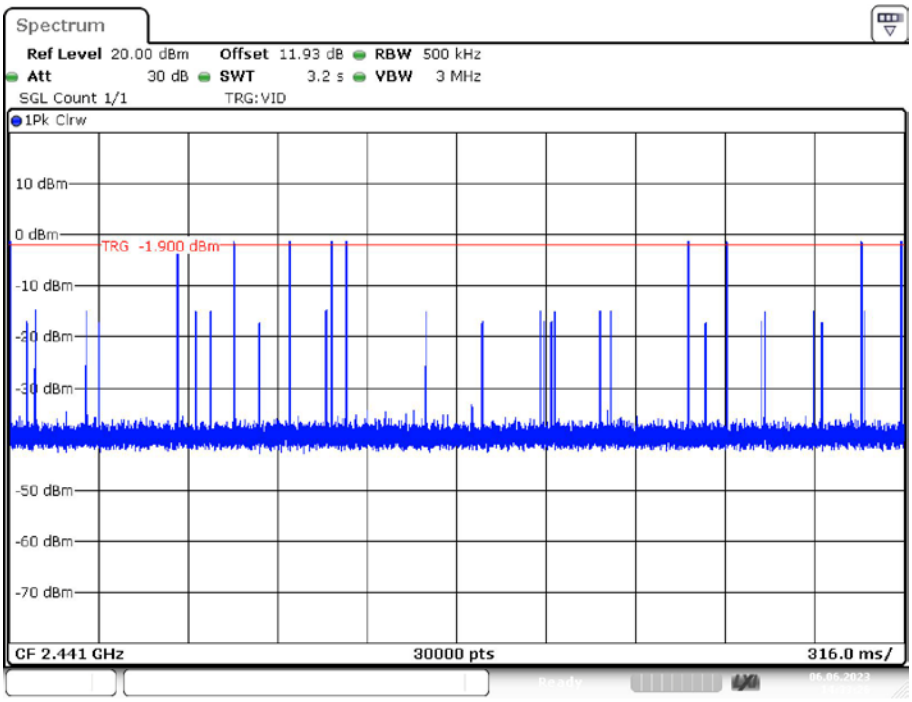

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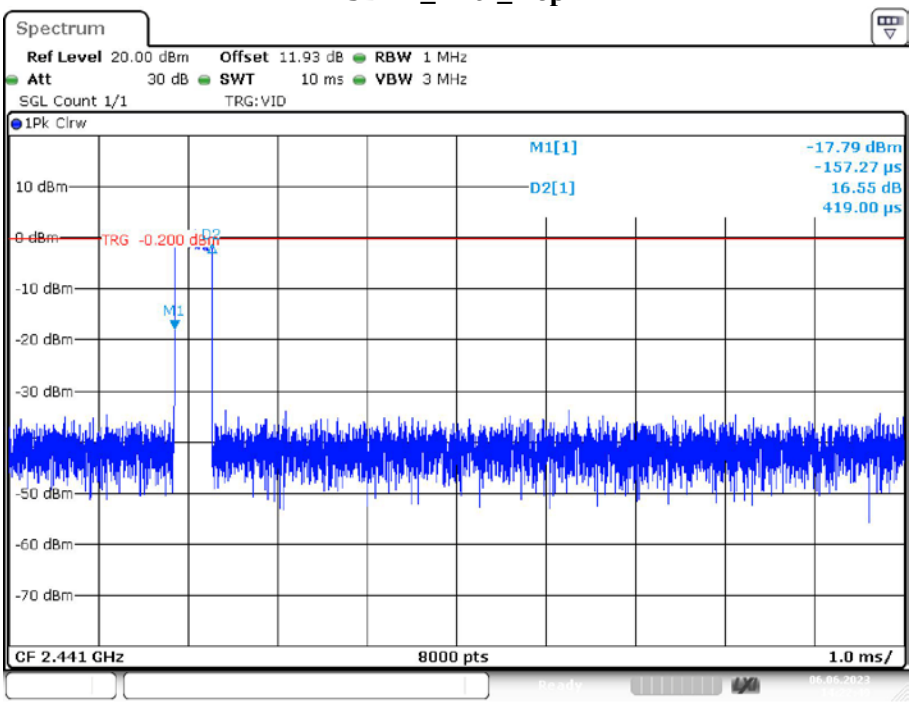
3DH1_Ant1_Hop



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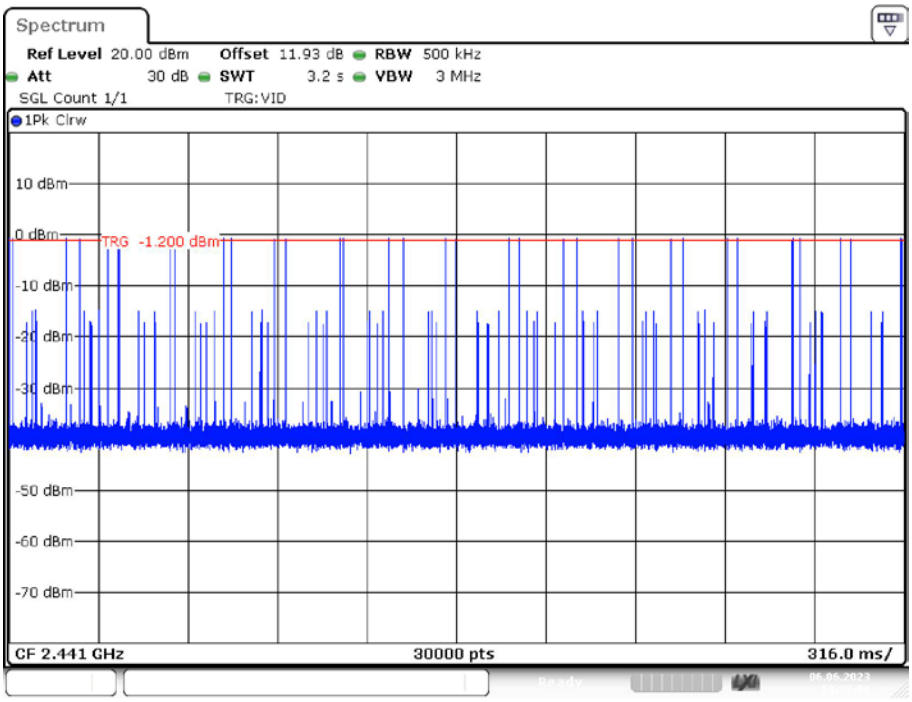

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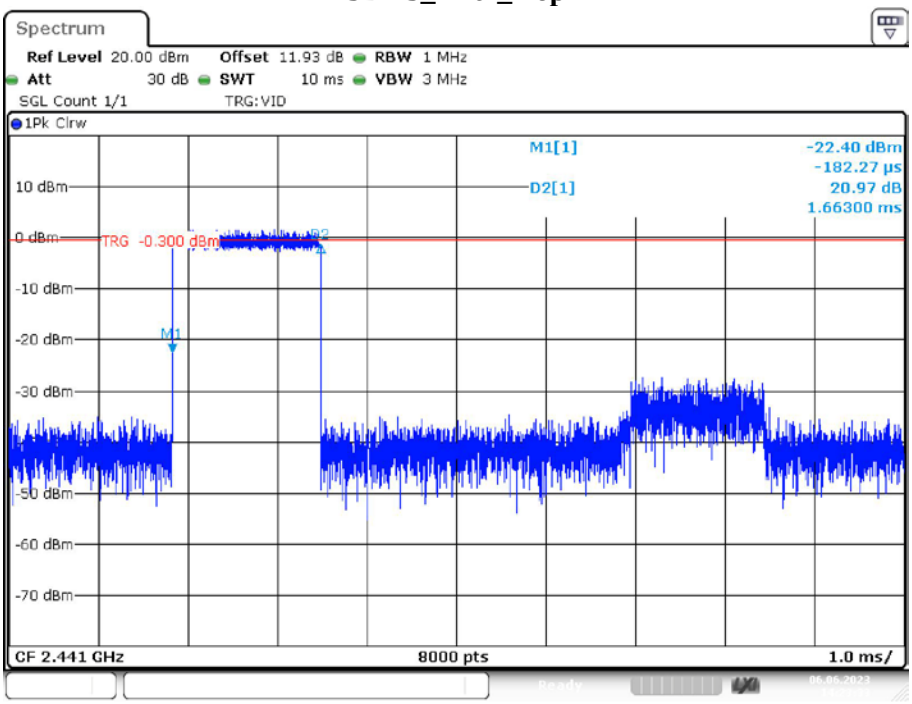
3DH3_Ant1_Hop



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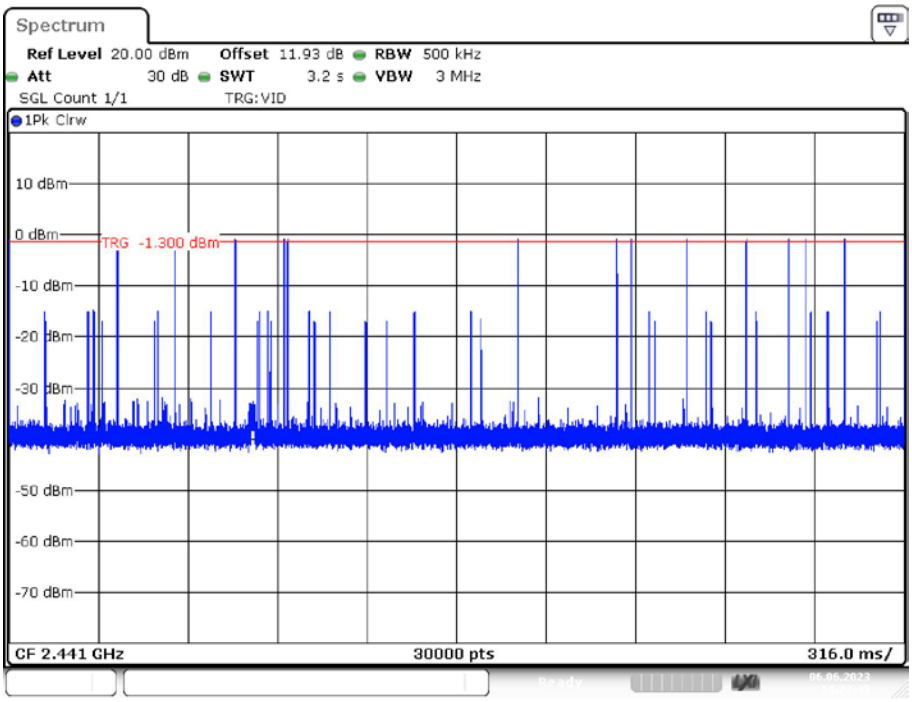

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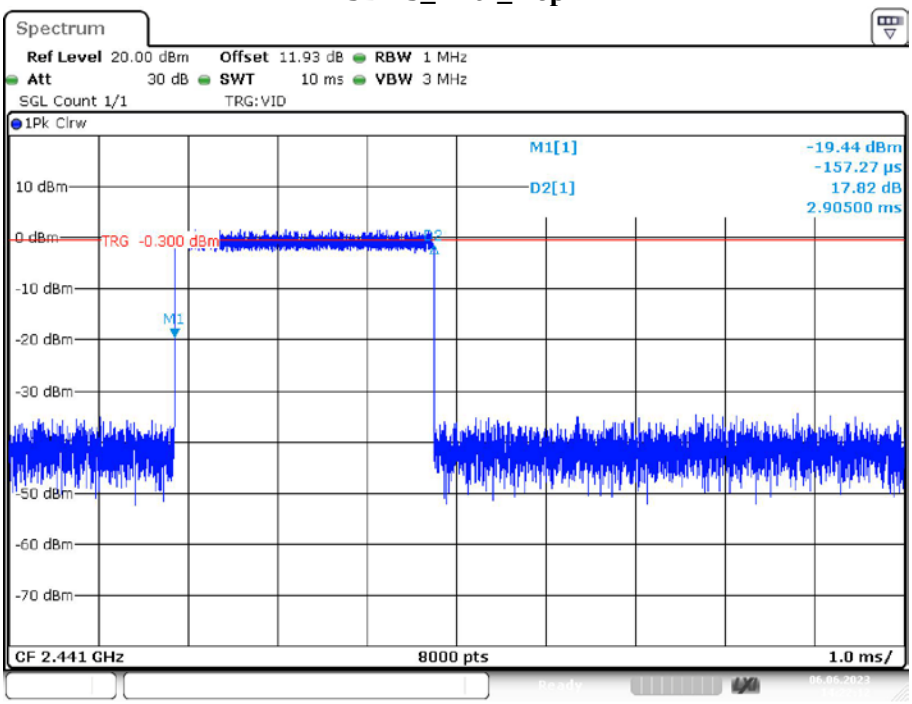
3DH5_Ant1_Hop



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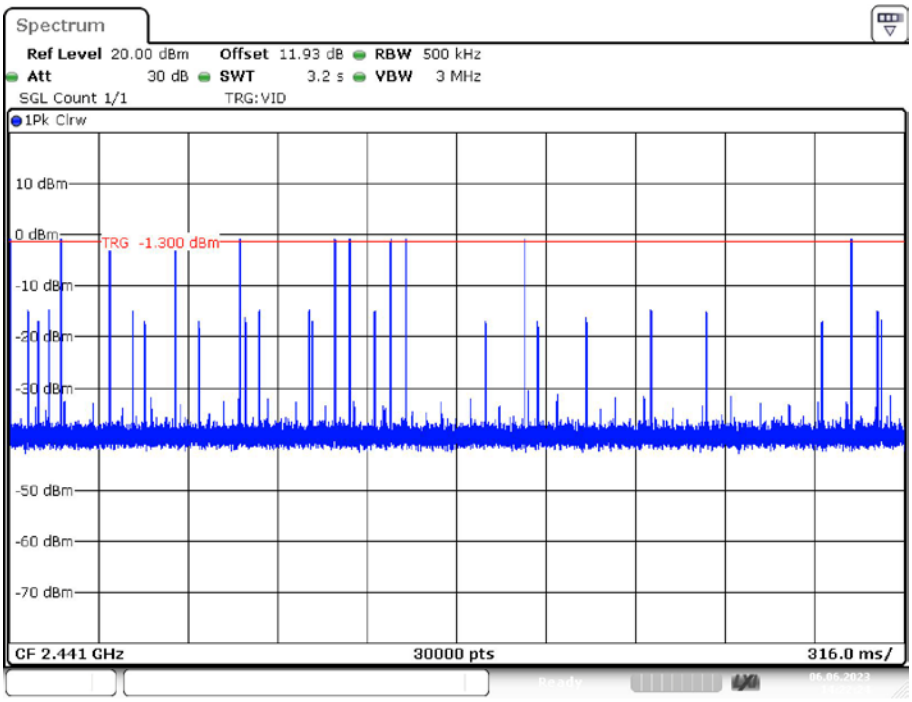


Date: 6.JUN.2023 14:22:23

FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

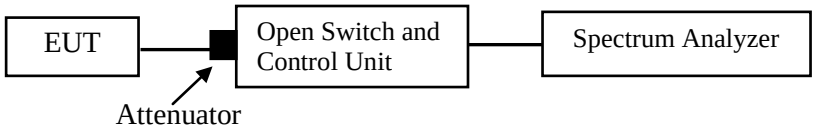
Applicable Standard

According to §15.247(b) (1), for frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. And for all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

Test Procedure

According to ANSI C63.10-2013, section 7.8.5

1. Place the EUT on a bench and set in TX mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
3. Add a correction factor to the display.



Test Data

Environmental Conditions

Temperature:	25℃
Relative Humidity:	43%
ATM Pressure:	101.0kPa

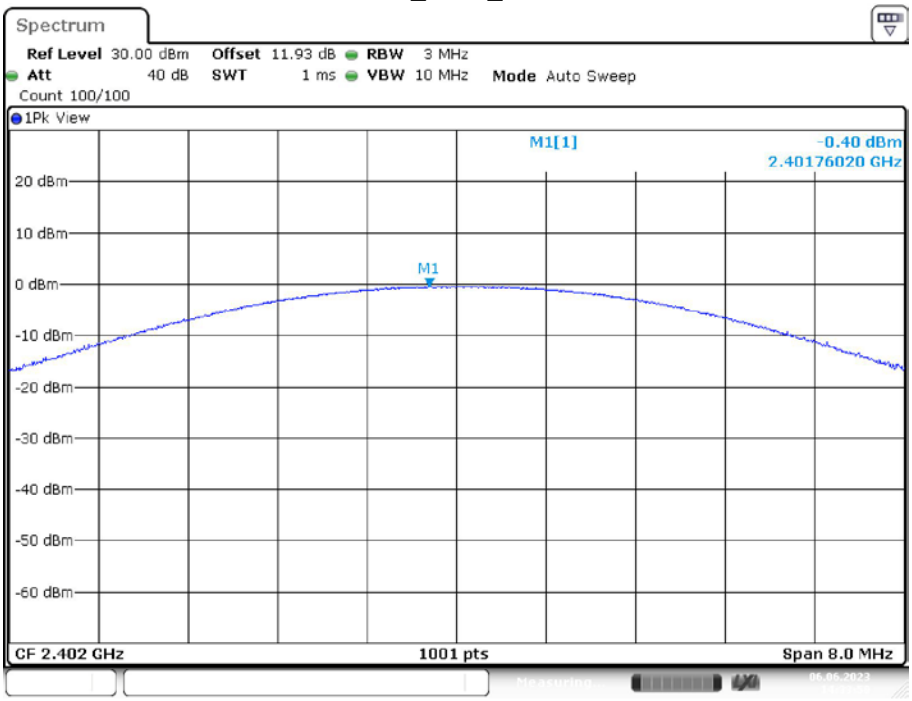
The testing was performed by Matt Liang on 2023-06-06.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to the below table and plots:

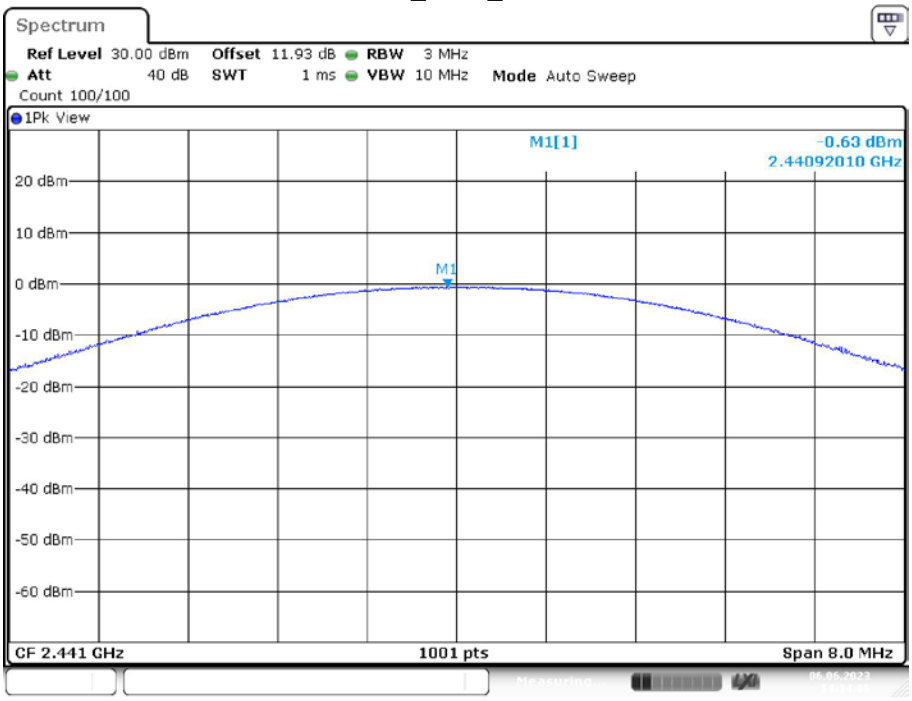
Test Mode	Antenna	Channel	Conducted Peak Output Power [dBm]	Limit[dBm]	Verdict
DH5	Ant1	2402	-0.40	≤20.97	PASS
		2441	-0.63	≤20.97	PASS
		2480	-1.42	≤20.97	PASS
2DH5	Ant1	2402	2.31	≤20.97	PASS
		2441	1.86	≤20.97	PASS
		2480	0.99	≤20.97	PASS
3DH5	Ant1	2402	**2.76**	≤20.97	PASS
		2441	2.46	≤20.97	PASS
		2480	1.60	≤20.97	PASS

DH5_Ant1_2402



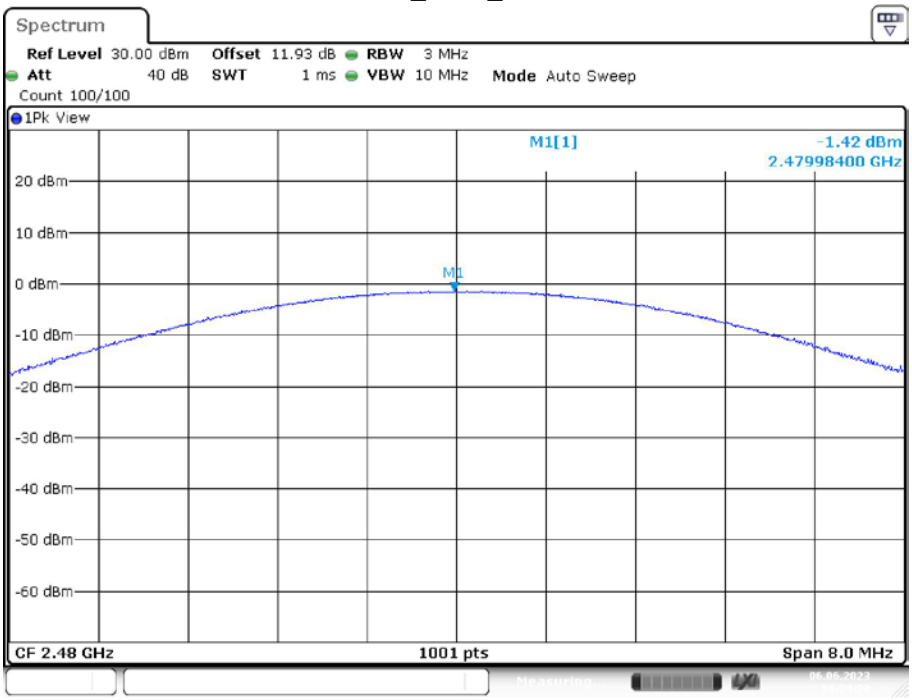
Date: 6.JUN.2023 14:33:50

DH5_Ant1_2441



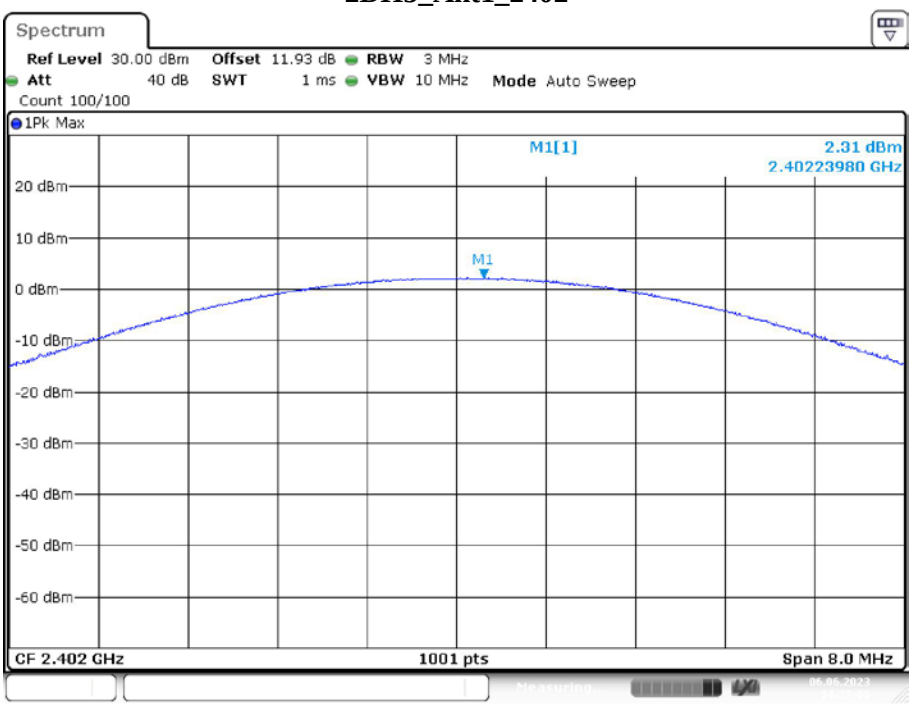
Date: 6.JUN.2023 14:34:06

DH5_Ant1_2480



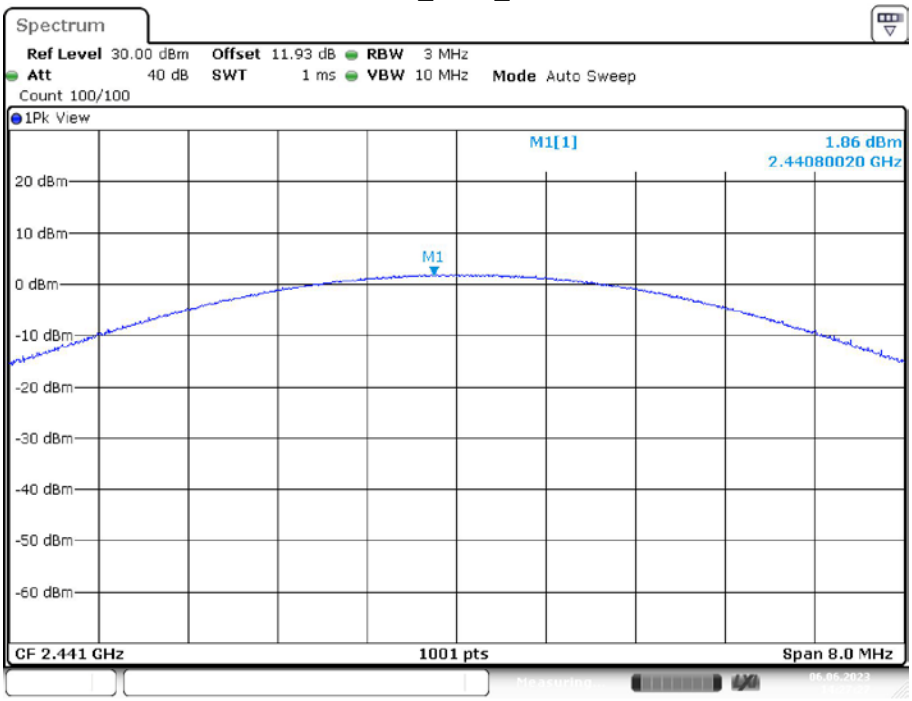
Date: 6.JUN.2023 14:34:20

2DH5_Ant1_2402



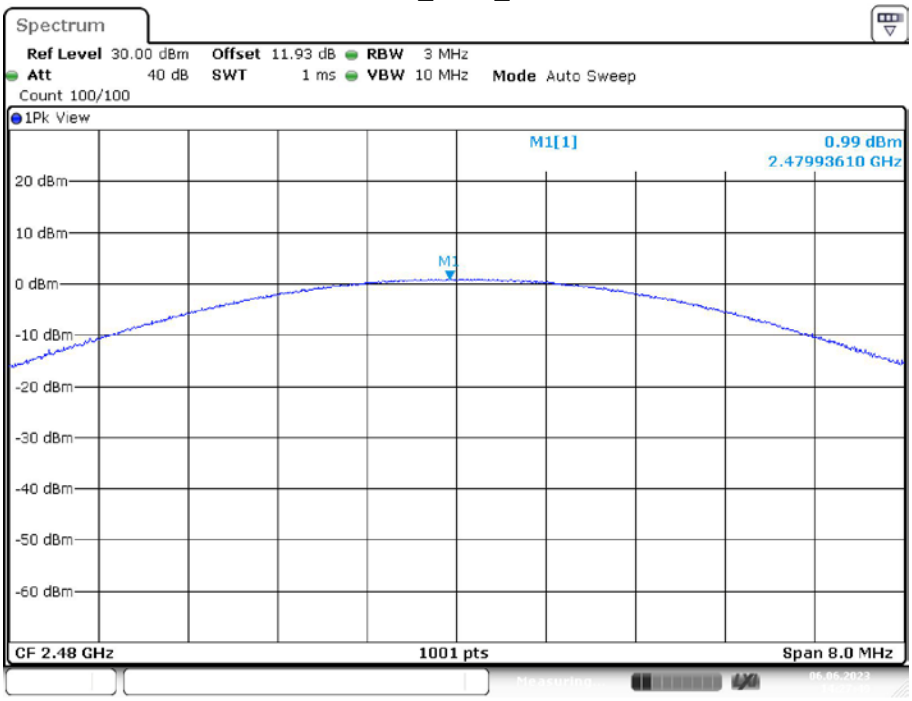
Date: 6.JUN.2023 14:27:06

2DH5_Ant1_2441



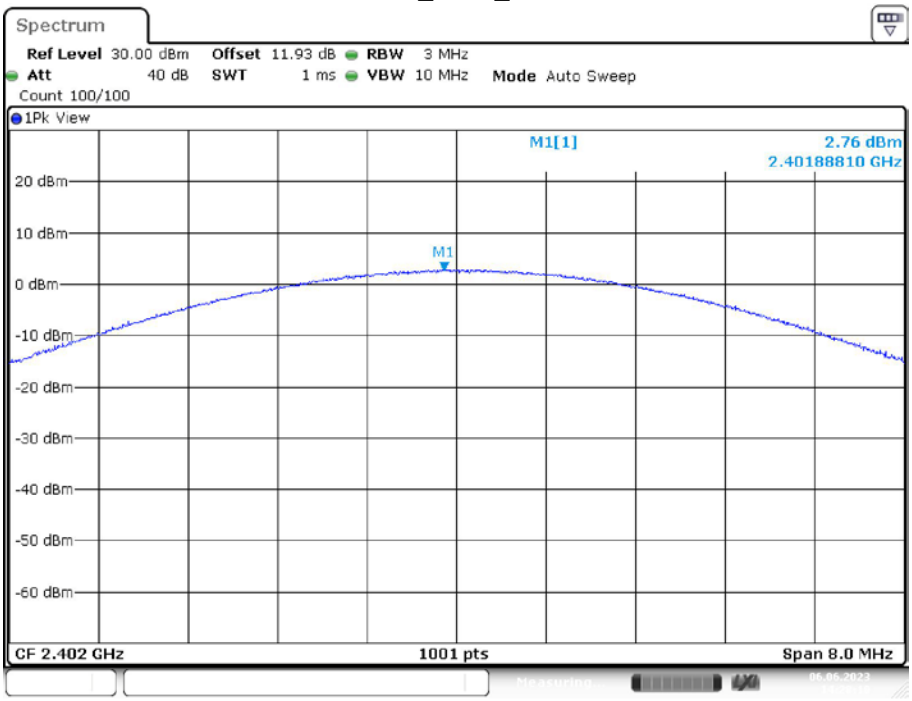
Date: 6.JUN.2023 14:27:27

2DH5_Ant1_2480



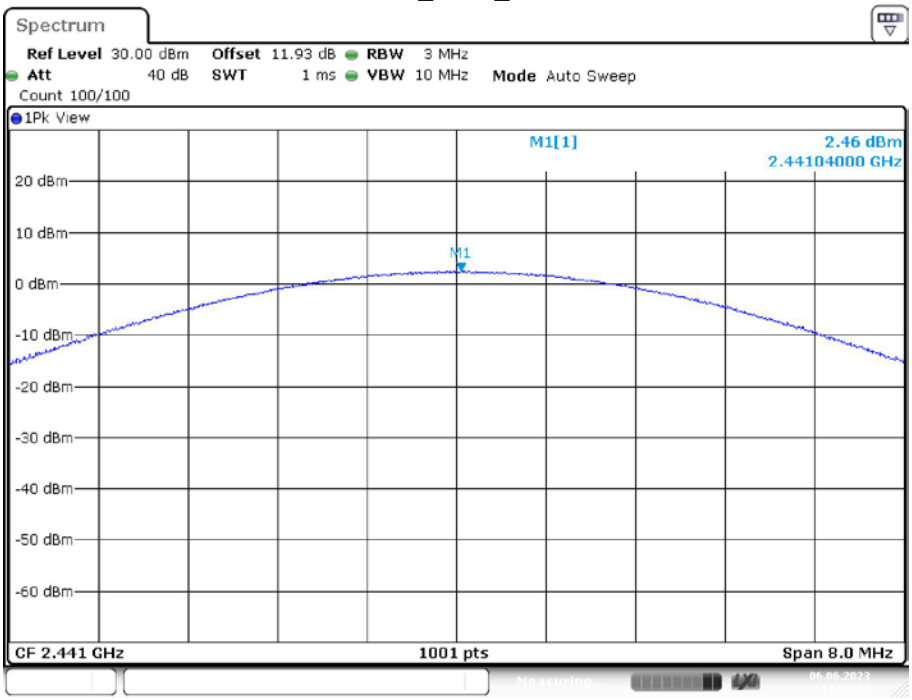
Date: 6.JUN.2023 14:27:49

3DH5_Ant1_2402



Date: 6.JUN.2023 14:28:10

3DH5_Ant1_2441



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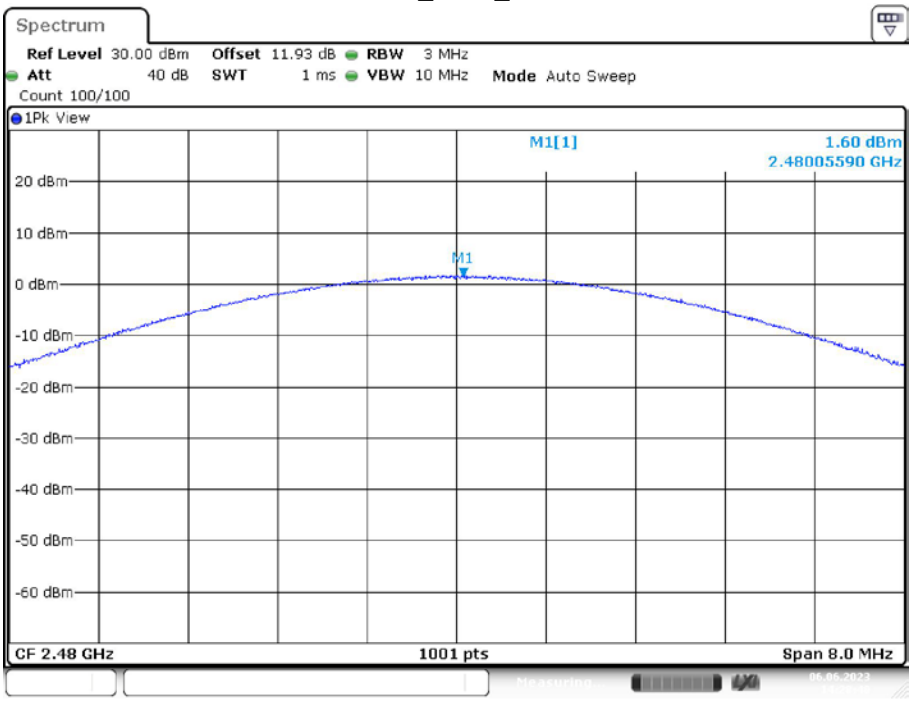
3DH5_Ant1_2480



Date: 6.JUN.2023 14:28:40

FCC §15.247(d) - BAND EDGES TESTING

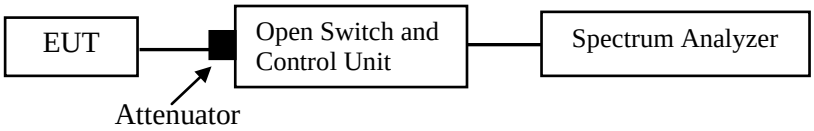
Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Procedure

According to ANSI C63.10-2013, section 7.8.6 and section 6.10

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in TX mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.



Test Data

Environmental Conditions

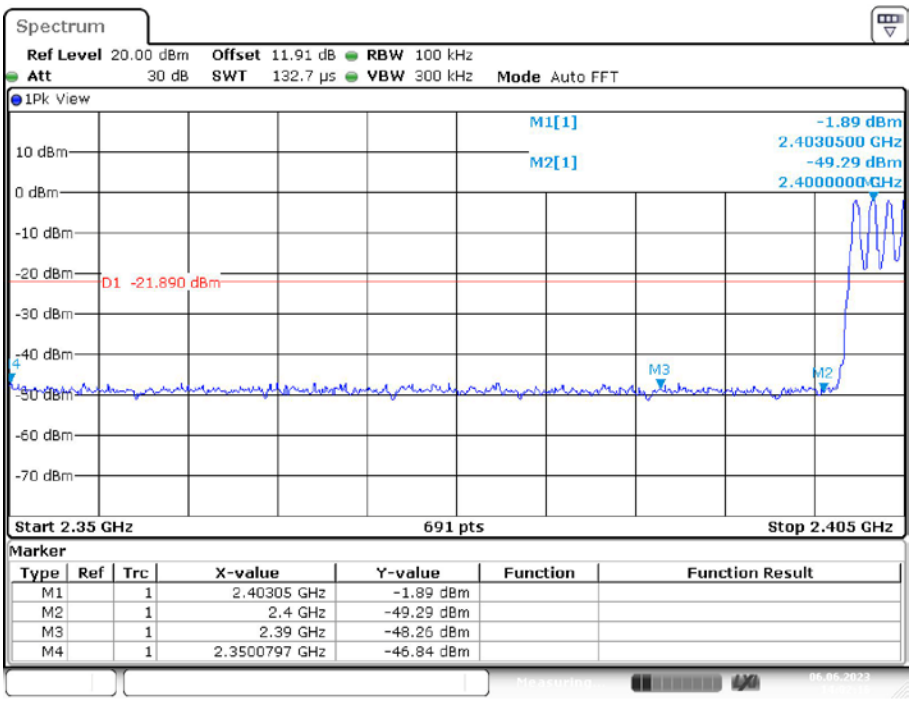
Temperature:	25℃
Relative Humidity:	43%
ATM Pressure:	101.0kPa

The testing was performed by Matt Liang on 2023-06-06.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to the below plots:

DH5: Band Edge-Left Side
Hopping



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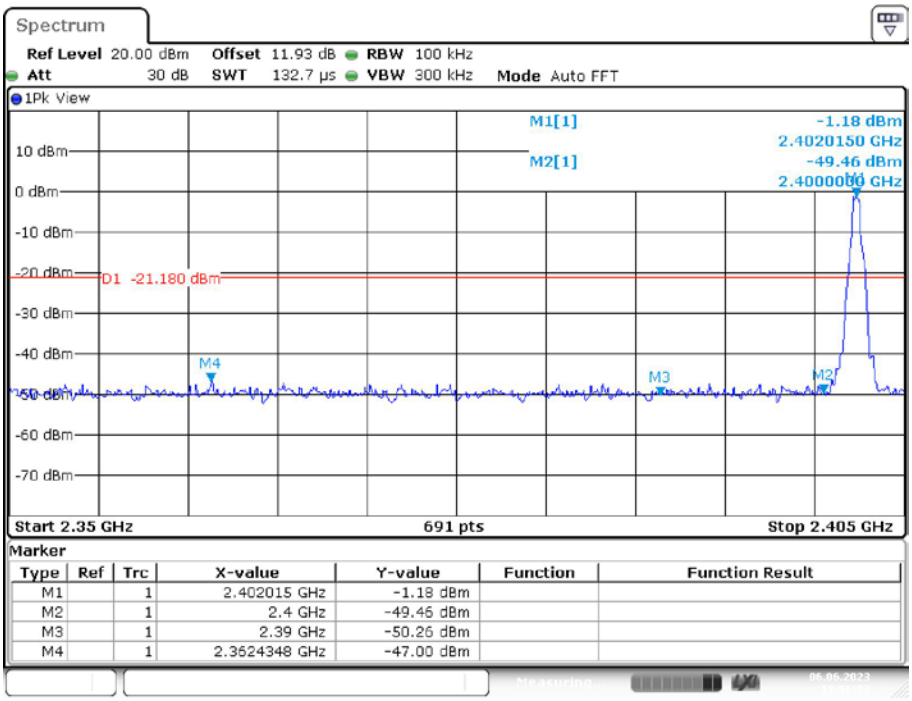
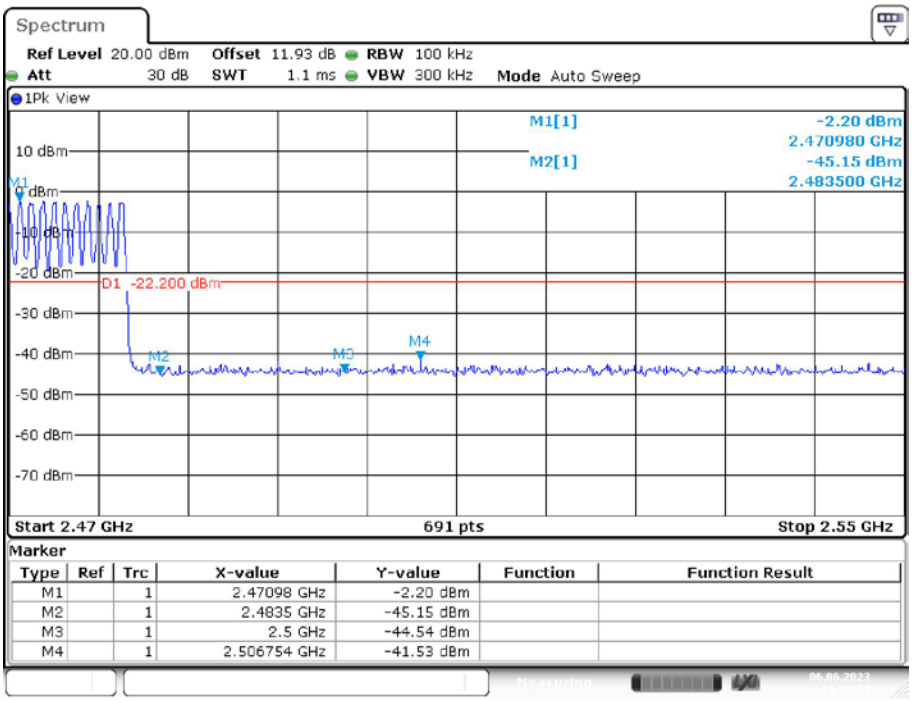
Single



Date: 6.JUN.2023 13:56:32

DH5: Band Edge- Right Side
Hopping



Date: 6.JUN.2023 14:14:54

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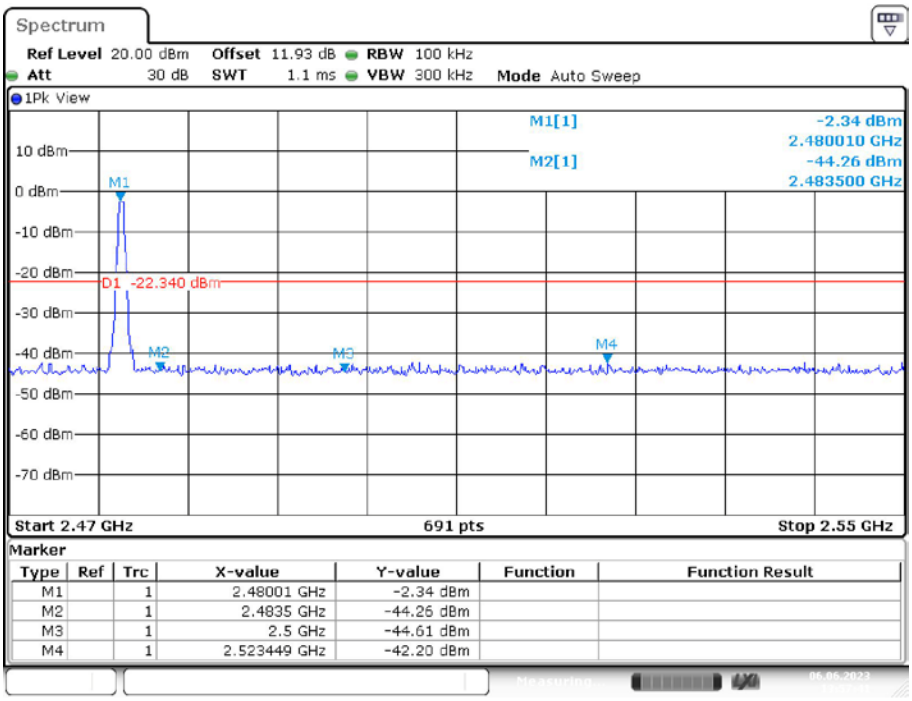
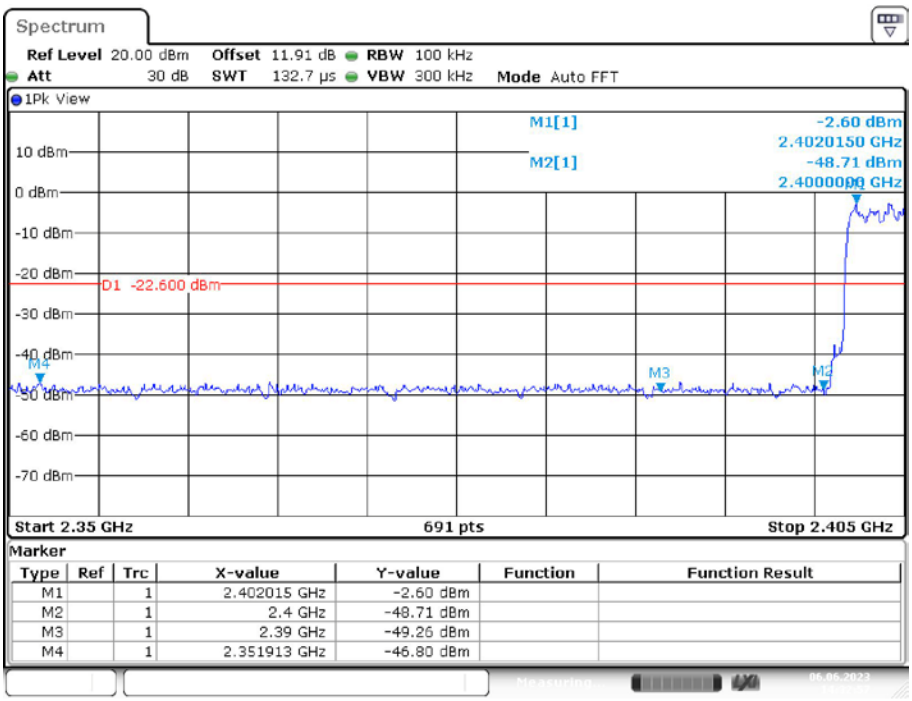


Date: 6.JUN.2023 13:57:40

2DH5: Band Edge-Left Side
Hopping



Date: 6.JUN.2023 14:32:57

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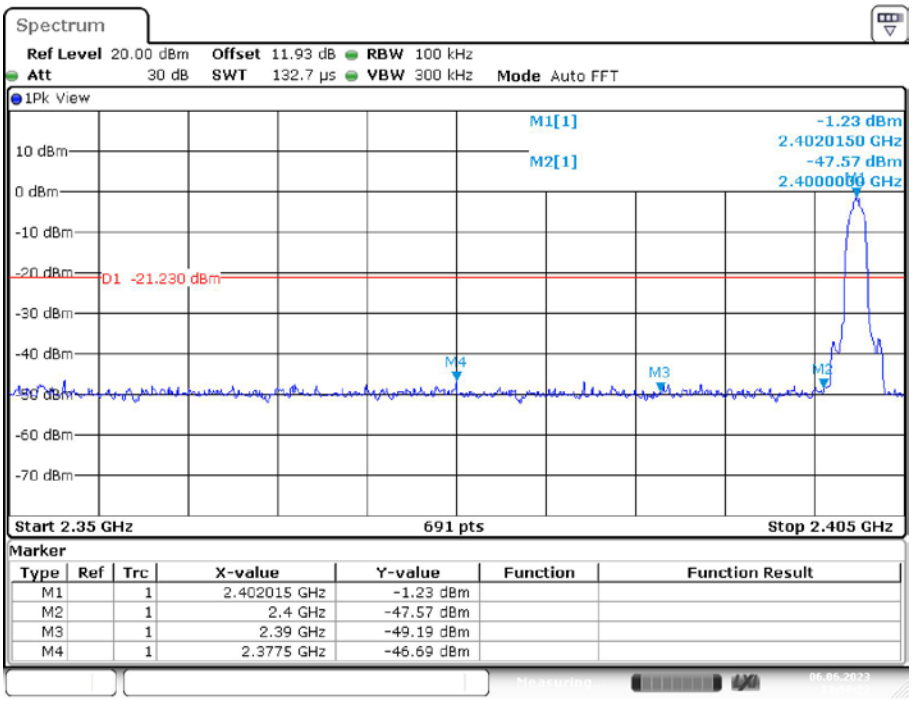
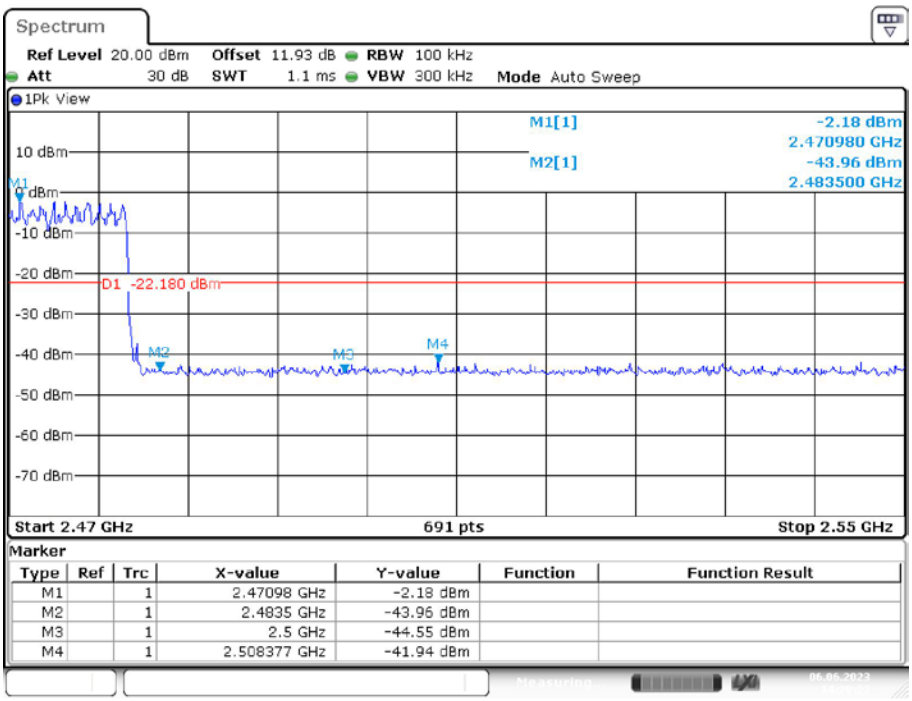


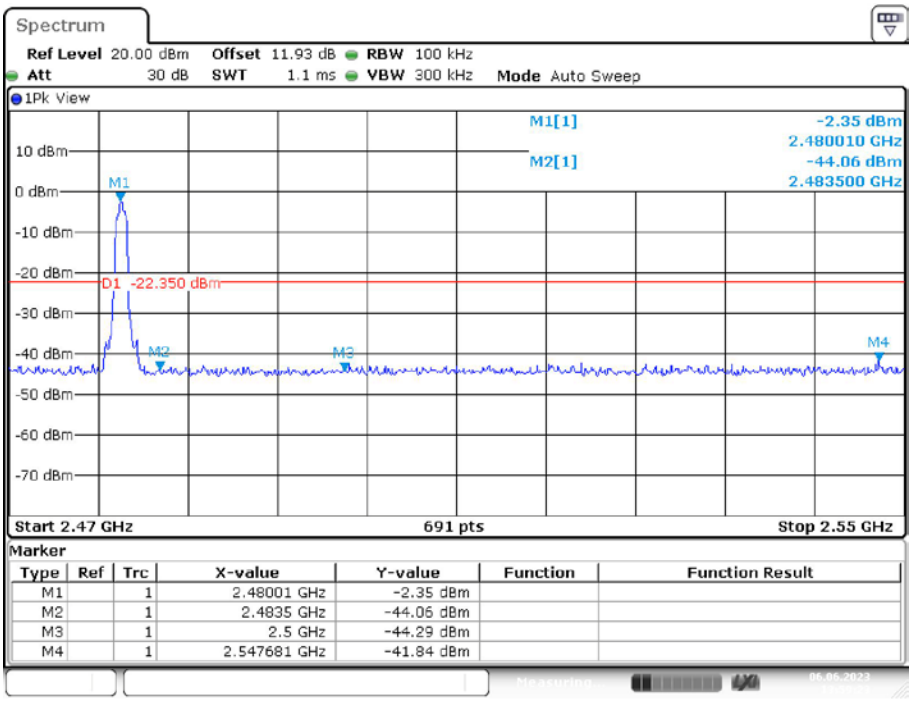
Date: 6.JUN.2023 13:58:22

2DH5: Band Edge- Right Side
Hopping



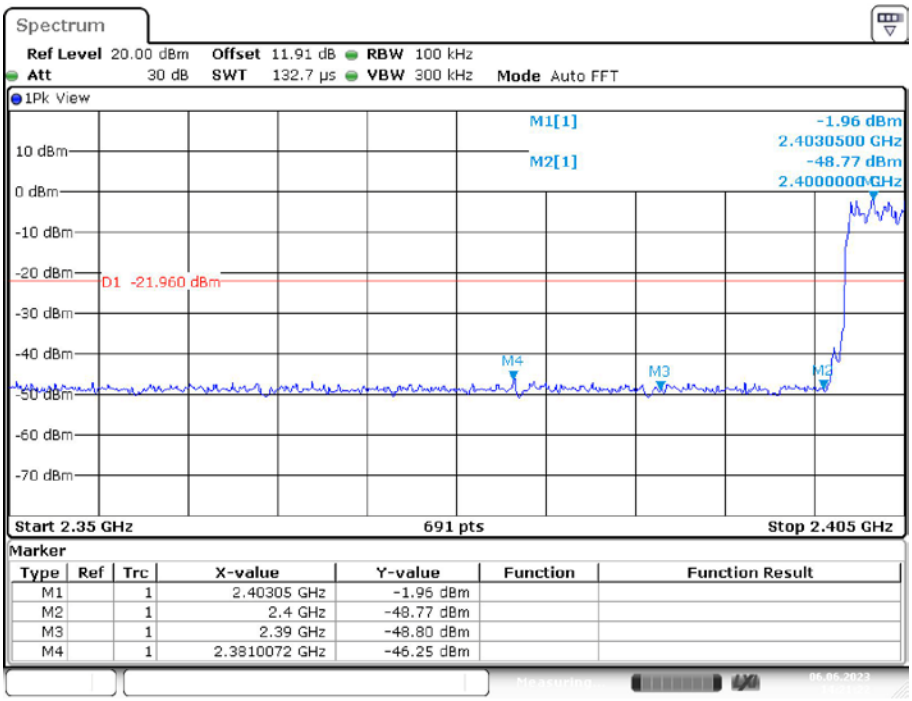
Date: 6.JUN.2023 14:20:22

Single



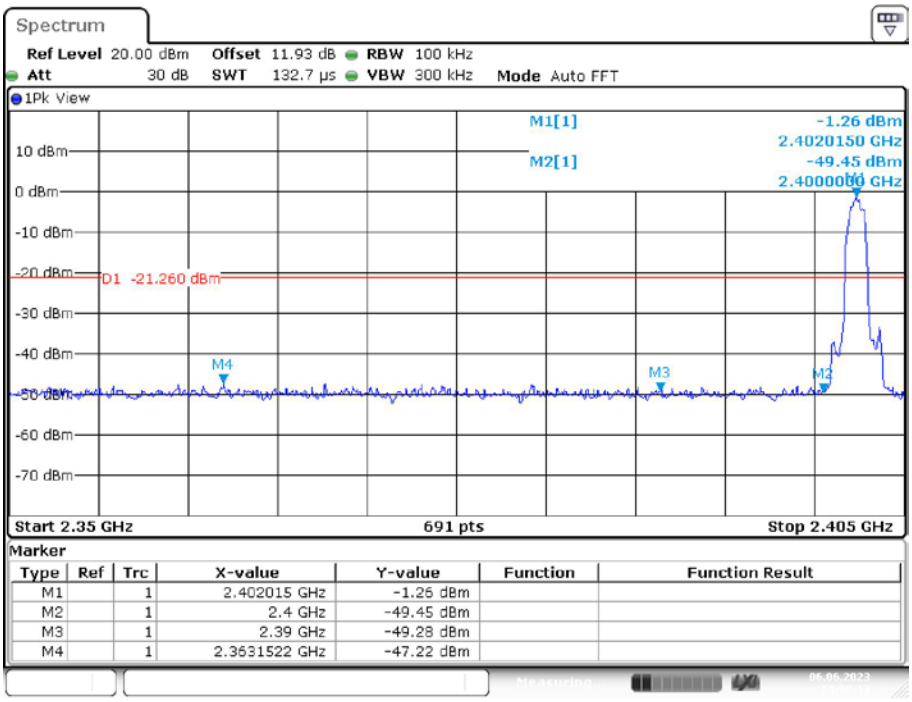
Date: 6.JUN.2023 13:59:22

3DH5: Band Edge-Left Side
Hopping



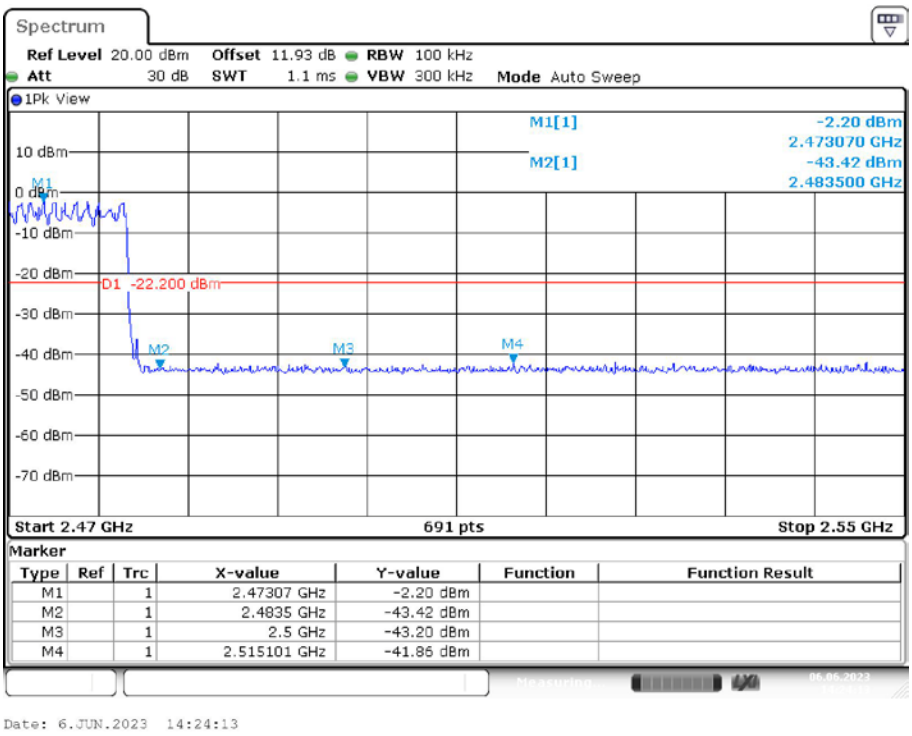
Date: 6.JUN.2023 14:21:22

Single



Date: 6.JUN.2023 14:00:13

3DH5: Band Edge- Right Side
Hopping



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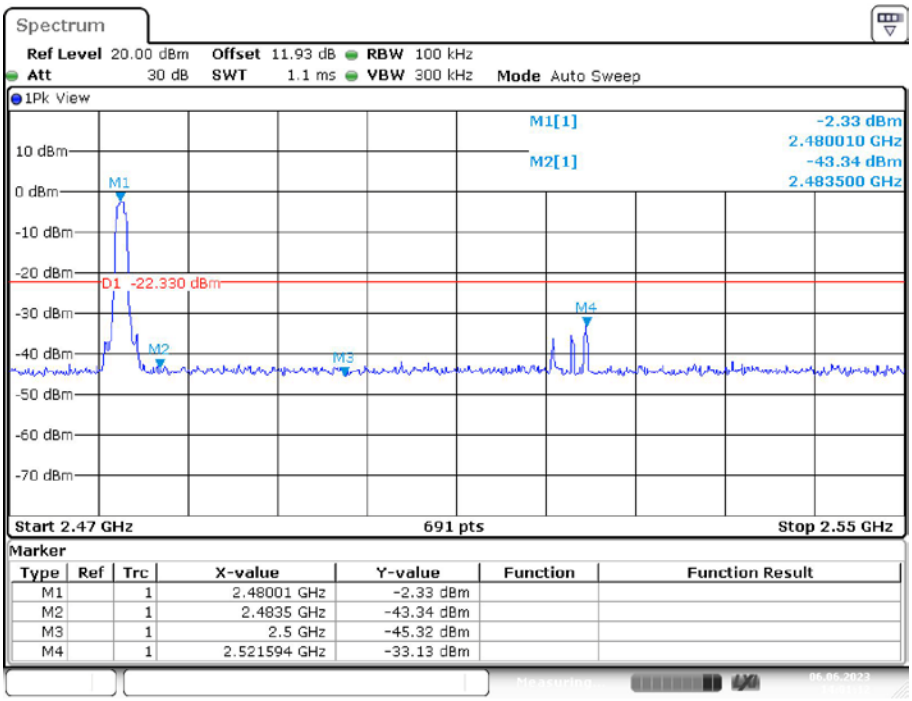
Single



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